

Patent

UNITED STATES PATENT APPLICATION

for

DATA BROWSING METHOD AND SYSTEM FOR USER INTERFACE

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DATA BROWSING METHOD AND SYSTEM FOR USER INTERFACE

RELATED U.S. APPLICATIONS

This application incorporates herein by reference, and claims
5 priority to, the commonly-owned co-pending provisional patent
application U.S. serial number 60/467,794, entitled "MULTI-MODE
CONFERENCE CALL SETUP AND MANAGEMENT AND DATA BROWSING
USER INTERFACE TECHNIQUE ('MULLET DATEBOOK') AND DYNAMIC
SIZING USER INTERFACE TECHNIQUE FOR DATA DISPLAY AND TEXT-KEY
10 CUSTOMIZATION FOR AUDIO MENU SELECTION," filed May 1, 2003, and
assigned to the assignee of the present invention.

FIELD OF THE INVENTION

The present invention relates to the field of user interaction
with calendar data in handheld portable electronic devices.

15 BACKGROUND OF THE INVENTION

As the components required to build a computer system have
reduced in size, new categories of computer systems have emerged.
A relatively recent category of computer system is the portable or
handheld computer device. A handheld computer system is a
20 computer that is small enough to be held in the hand. As a result,

these devices are readily carried about in a briefcase or purse, and some handheld devices are compact enough to fit into a person's pocket. By virtue of their size, handheld computer systems are also lightweight and so are exceptionally portable and convenient.

- 5 Further development of handheld devices has enabled their use for more and more tasks. For example, portable, and even wireless, access to computer networks is now readily available with suitably configured devices. The portability and convenience of handheld devices has enabled the even more exciting possibilities
- 10 encompassed by the combination of the capabilities of handheld devices with the communication convenience of wireless telephones, e.g. cellular phones.

As more and more of these devices are carried in everyday activities, the demand for more and more capability from these

15 versatile machines also grows. The demanding environment of modern working life sometimes requires multi-tasking by the individual, requiring a careful scheduling of daily events as well as the events of the busy workplace, often using the assistance of planning or scheduling aids or planners. Often these weekly and

20 monthly planners need to be accessed while the user is on the go.

As convenient as handheld computing devices are, users demand ease of use. Often a simple task such as scheduling a meeting or checking a meeting time requires two hands and a convenient lap or desk. It would be desirable to simplify the graphical user interface experience for a user and present helpful information in an intuitive manner.

SUMMARY OF THE INVENTION

Accordingly, embodiments of the present invention are directed to a method for manipulating and viewing weekly organized and monthly organized calendar data in a database. The method is
5 implemented in a portable computing device, such as a handheld computing device, and user input can be accepted by alpha-numeric input, touch-screen display tactile input or by five-way navigation button, for example.

More specifically, embodiments of the present invention relate
10 to methods and devices for graphically managing and manipulating calendar data in a database which comprise presenting calendar data in a week view display of a graphical user interface. This mode includes graphically navigating in the week view display by moving from day to day and appointment to appointment and, when an
15 appointment is selected, presenting a small preview window, e.g., pop-up, which lists the details of the selected appointment in the week view display. The preview window is displayed while the week view is fully displayed and accessible by the user. Embodiments of the present invention are enabled to accept user input by responding
20 to pressure applied to an element of a five-way navigation button in won implementation. Embodiments are also enabled to present

portions of the week view display in an extended display area when an active input area (AIA) is collapsed in a handheld device implemented with a rectangular display.

Embodiments of the present invention are also presented which are enabled to present a month view display that can be graphically navigated, either by five-way navigation button input or by stylus input to a touch screen display. Navigation in the month view comprises moving from day to day and from week to week. When a day is selected, a preview pop-up window can appear in the month view display while the monthly view is also displayed and accessible the preview window lists the scheduled appointments or events for that day. In embodiments of the present invention implemented with color displays, user-assigned categories of appointments can be shown as icons in the month view.

Embodiments of the present invention implemented in devices enabled with a rectangular display are enabled to expand the month view when an active input area is collapsed.

Embodiments which are implemented in devices enabled with displays in a rectangular format can be called tall screen devices, some of which are implemented in handheld devices that slide open or unfold to present the extended screen area which allows the

presentation of the active input area (AIA). In embodiments implemented in openable tall screen devices, the display acts as in a square screen implementation until the device is opened. However, with the AIA expanded, user interaction follows the square screen implementation except for the availability of the status bar and preview. When the display screen area is available on a tall screen device by collapsing the AIA, many of the preview functions available in other embodiments of the present invention migrate to the newly available area.

10 Embodiments of the present invention present five-way navigation usable in calendar viewing. Five-way navigation is especially useful in the month view. A view of the previous/last month is available on a tall screen device if the AIA is collapsed with no existing appointment highlighted. One capability of the month view is visibility of specific categories of appointments and categorized preview on a tall screen device. When an appointment is highlighted, the preview window shows as many appointments as possible and scrolling is possible within the preview window. Selecting a highlighted day causes embodiments of the present invention to present a full day view of the highlighted day.

BRIEF DESCRIPTION OF THE DRAWINGS

The operation and components of this invention are described by reference to the drawings.

Figure 1 illustrates, in block flow diagram, a method for
5 browsing, manipulating and viewing data consistent with
embodiments of the present invention.

Figure 2 illustrates an exemplary handheld computer device in
accordance with embodiments of the present invention.

Figure 3A illustrates an exemplary physical embodiment of a
10 portable computer system in accordance with one embodiment of the
present invention.

Figure 3B illustrates an exemplary physical embodiment of a
portable computer system in accordance with another embodiment of
the present invention with an extended screen mode.

15 Figure 3C illustrates a physical embodiment of a portable
computer system in accordance with one embodiment of the present
invention with an extended screen mode and a graphical user
interface.

Figure 4A illustrates a sequence of calendar data display in accordance with an embodiment of the present invention for weekly view.

Figure 4B illustrates a second sequence of calendar data display in accordance with an embodiment of the present invention for weekly view.

Figure 4C illustrates a sequence of calendar data display in accordance with an embodiment of the present invention for monthly view.

Figure 4D illustrates a second sequence of calendar data display in accordance with an embodiment of the present invention for monthly view.

Figure 5A illustrates category selection technique for the calendar data display in accordance with an embodiment of the present invention.

Figure 5B illustrates category color embodiment of the calendar data display in accordance with an embodiment of the present invention.

Figure 6A illustrates techniques for category modification in the calendar data display in accordance with an embodiment of the present invention.

Figure 6B illustrates techniques for options selections in the
5 calendar data display in accordance with an embodiment of the present invention.

Figure 7A illustrates techniques involving display options in the calendar data display in accordance with an embodiment of the present invention.

10 Figure 7B illustrates techniques involving display options in the calendar data display in accordance with an embodiment of the present invention.

Figure 7C illustrates resolving schedule conflicts in the calendar data display in accordance with an embodiment of the
15 present invention.

Figure 7D illustrates that category links can be hidden in the calendar data display in accordance with an embodiment of the present invention.

Figure 8 illustrates an exemplary portable, wireless, computer system, optionally enabled as a telephone, in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit
5 the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best
10 utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims appended hereto and their equivalents.

In this discussion of some embodiments of the present
15 invention, the terms, "handheld device," "portable electronic device" and "portable computing device" are used more or less interchangeably, as noted previously. In each case, they refer to a class of relatively small, user-portable, computing devices that are capable of performing the functions of portable computing devices
20 and, importantly, accept user input in the form of pressure applied to, for instance, a touch-screen display/input device, through alpha-

numeric key input, or through a multi-directional navigation button, etc. Some of the above terms are also used to refer to devices that combine the functions of portable computing devices with those of wireless telephones.

5 It is noted here that specific names are used herein for many of the features presented in embodiments of the present invention. The names are used in this discussion only for example and illustration. Embodiments can be implemented with different names and can present different languages without limiting the functions
10 and features found in these embodiments.

Figure 1 illustrates, in block flow form, a computer implemented method for graphically managing and manipulating calendar data in a database. There, process 100 begins by presenting an element of data in a graphical user interface, 110. This can be a
15 monthly calendar graphical display or a weekly calendar graphical display and either can be displayed in response to a user activating a button. It is noted that a graphical user interface can be presented in many different types of devices and that embodiments of the present invention are enabled for operation in various types of
20 devices. However, embodiments discussed herein can be implemented in a portable or otherwise handheld computing device.

Process 100 continues by accepting user input in the graphical user interface at step 120. It is noted that embodiments enabled to operate in handheld devices can accept input by several means, including but not limited to stylus tapping on a touch-screen display, keyed alpha-numeric input and by interaction with navigation buttons, e.g., a five way navigation tool. However, in one embodiment of the present invention, inputs may be taken from a user applying pressure to elements of a five-way navigation button. One five-way navigation button implementation features, as elements: up, down, left, right arrows, and select or pick button. According to step 120, the user may navigate to either a day of month or an appointment of a weekly view

Process 100 continues by graphically acknowledging the user input through the five-way navigation button, 130. One response is to move or highlight a graphical cursor in the direction of the element depressed. For example, "up" results in a cursor movement toward the top of the display, "down" results in a cursor movement toward the bottom of the display, "left" results in a cursor movement toward the left side of the display, and "right" results in a cursor movement toward the right side of the display. Depressing "Pick" or "select" can result in a selection of a highlighted graphic

feature. It is noted that the above names may not be present in all implementations. In some embodiments, symbols such as arrows can suffice to indicate the directions associated with the individual five-way button element.

5 It is also noted that responses to user input can be other than a cursor movement. In some cases, a highlighting can move from one graphical element to another. In others, a response can comprise a change of color or other property of a graphic element. Depressing elements of the five-way button result in graphic actions that are
10 graphically intuitive to the user.

Process 100 continues further by responding to the user input, 140, by implementing a command which manipulates data. Manipulations can comprise graphically associating data in the graphical user interface and to the input received. In the graphical
15 user interface, this means that a selection button will select the element of the highlighted other graphical element and data associated with those selected graphical elements is manipulated in some fashion. When appropriate to the data presented and to the user input received, graphical elements in the graphical user
20 interface change to reflect internal data manipulation.

AT step 150, if the user is in monthly view, then a small window will open to display appointments related to the selected day while the monthly graphical user interface remains displayed. Navigation through other days in the calendar will update the contents of this small window. Alternatively, at step 150, if in weekly view, then a small window will open to display the subject matter of the selected appointment while the weekly graphical user interface remains displayed. Navigation through other appointments will update the contents of the small window.

It is noted that, while embodiments of the present invention are implemented in devices with monochrome displays, there are features in other embodiments which are enhanced in their function by being implemented in color displays. In some embodiments, color highlights change color depending on the user input. In other embodiments, categories of data and their relationships are graphically presented in category-dependent colors.

Figure 2 illustrates a portable electronic device in accordance with an embodiment of the present invention. In this illustration, the portable electronic device is implemented as a handheld computing device, 200. Device 200 is enabled with a touch-screen display 201 and an active input area (AIA) 202.

Device 200 is also implemented with application buttons 204 and five-way navigation button 203. The five-way navigation button shown at 203 comprises "up" button 205, "down" button 206, "left" button 207, "right" button 208 and "pick" button 209. "Pick" button 209 can also be known as a "select" button.

It is noted that the presence, use, and position of application buttons 204 may vary in different implementations without limiting effect on embodiments of the present invention. Device 200 is also equipped with a stylus 210 which allows a user to easily input to the device via the pressure sensitive membrane or digitizer of the touch-screen display, 201.

Embodiments may employ variations of touch-screen display 201. The implementation illustrated is a "tall screen" device, meaning that it is enabled to present more information than a substantially square screen device in that it is enabled to use active input area (AIA) 202 as an extension of the normal, square, display area. It is noted that the presence, use, and position of application buttons 204 may vary in different implementations without limiting effect on embodiments of the present invention.

Figure 3A illustrates another portable electronic device in accordance with an embodiment of the present invention. In this illustration, the portable electronic device is implemented as a handheld computer, 300 enabled with wireless phone capabilities.

5 Device 300 is enabled with a touch-screen display 301 and an active input area (AIA) 302.

It is noted that the particular device 300 illustrated is implemented in a folding or telescoping form factor. In this illustration, line 310 illustrates a dividing line between upper body
10 portion 311 and lower body portion 312 which is shown slid over touch-screen display 301, thus showing only the uppermost portion of the display. The form factor shown is only an example of implementations available in embodiments of the present invention and is not meant to limit embodiments to any particular form factor.

15 Portable electronic device 300 is enabled with a numeric keypad 303 which comprises, in this implementation, numeric keys 0-9 as well as "star" and "pound" keys. The exemplary keypad shown is only for illustration and is not meant to limit alphanumeric input devices any particular form in embodiments of the
20 present invention.

Portable electronic device 300 is also enabled with a five-way navigation button, 203. The five-way navigation button comprises "up" button 205, "down" button 206, "left" button 207, "right" button 208 and "pick," or "select," button 209.

5 Figure 3B illustrates portable electronic device 300 in an open position, with lower portion 312 retracted and exposing the full expanse of rectangular touch-screen display 301. In the display's exposed position, active input area 302 is shown.

It is noted that embodiments of the present invention are
10 enabled with an active input area, 302, that can be "collapsed." Collapsing the active input area allows the effective display area to expand, making use of the active input area when not needed for input. Figure 3C illustrates portable electronic device 300 with active input area 302 collapsed to allow a graphical user interface
15 display, in this illustration showing a weekly calendar, to be shown in the full expanse of the display area.

It is also noted that some embodiments of the present invention may operate in devices with square screens. While a square screen may affect the displays shown, such embodiments
20 operate in the same manner as those embodiments implemented with

rectangular screens. Another name for the taller, rectangular, display can be "tall-screen." This term will be used interchangeably with "rectangular screen" in further discussions of embodiments of the present invention.

5 In embodiments of the present invention, five-way navigation button 203 is used to, among other tasks, move a cursor in the graphical user interface. The design of the five-way navigation button enables a user to move about the graphical user interface displayed and make selections of on-screen items using a single
10 finger. One-hand operation, and thus one-hand access to a database resident in the portable electronic device, is thus enabled. An example of situations in which this is useful is in commuting where a user may be standing in a jolting subway car with only one hand available for using the portable electronic device. Five-way
15 navigation button 203 enables complete access to all data and programs within device 300 with a single finger.

An example of an operation enabled by embodiments of the present invention is illustrated in Figure 4A. There, calendar data have been accessed in order to schedule an appointment and the user
20 is in the weekly view. The embodiment illustrated, accessed either by stepping through a list of applications by five-way navigation

button or by application buttons selection 400, supports a number of means of searching through calendar data. Among these are:

graphically browsing the calendar from week to week in order to see what general availability of open time slots is, looking for

5 important category information, and inserting a highlight. The embodiment illustrated, showing a weekly organized graphical display of calendar data in a tall screen device, can also use an expanded display area (a collapsed active input area) to browse existing appointments before selecting a particular day or
10 appointment to schedule or to get more detailed information. It is noted here that the term "appointment" is used in the ensuing discussion of embodiments of the present invention to include any scheduled event, whether it is a meeting, a deadline, a memorable event or anything else that can be associated with a specific date
15 and time in a calendar.

An embodiment of the present invention supports both square and tall screen devices. Screen illustration 401 shows a representation of a collapsible active input area and a status Bar in the graphical user interface as well. Embodiments implemented in
20 tall screen devices are able to present a display as shown in 401. It

is noted that the display shows a graphic image of a weekly calendar and can be called a week-view display.

Embodiments of the present invention implemented in square screen devices show a week-view calendar but not an active input area or on-screen status Bar. On tall screen devices with a sliding mechanism form factor, such as shown in Figure 3A – 3C, the ensuing example of a graphical user interface interaction can follow that of a square screen implementation until the device is slid to the open position.

However, though in the open position, with the active input area expanded, the interaction example follows the square screen implementation except for the availability of a status bar on some form factors. Once the display area is available on a tall screen device by collapsing the active input area, many of the preview functions available in other embodiments of the present invention migrate to the new area, but only if the active input area is collapsed in advance by the user.

The exemplary interaction illustrated in Figures 4A – 4D can be called a “Five-Way Week View.” Five-way interaction in week view, such as is shown at 401 and subsequent, and the view itself, is

enhanced visually for an embodiment of the present invention. It is noted that, in week-view, more hours in each day are available for view on a tall screen device if the active input area is collapsed.

A feature of a five-way related week view, in this embodiment, is the availability of visibility of the day, month, title, time and location of specific appointments within the week and the introduction of a preview, such as a time-out interval, when an appointment is highlighted. Selecting a highlighted appointment, such as by pressing selection element 209, returns a user to the no-highlight, week view display, 401, which is July 22-28, 2001, in this example.

Navigation through a calendar in this embodiment is achieved by a user's pressing a right button element, 208, as shown at 402. In this example, the following week, July 29 - August 4, 2001, becomes visible as at 403. Navigation up or down shows appointments that are initially out of view. Navigation down is exemplified by use of down button element 206 at 404, which in view 403 scrolls to show appointments after 6:00 PM, as shown in view 405. Pressing select button element 209 when the graphical user interface cursor is over a colored appointment block, 406, highlights the appointment block and produces the appointment

details in area 409 of view 408. This is selecting the particular appointment to which the user navigated.

Navigation left or right in week view moves week-by-week as discussed above. Pressing select button element 209, in this embodiment, highlights the first appointment of the week or the next appointment of the current day if the currently highlighted appointment is in the currently viewed week, as exemplified at 409 in view 408. In the example shown in view 408, the current day and time is Monday the 30th of July, after 10:00 AM.

10 It is noted that there is also, in some embodiments, an ability to select a category of appointments to view. A category of appointment can, in those embodiments, be selected by pull-down menu as well as other means, and will be discussed further below. In view 408, highlighting or selecting appointment 409 results in
15 the appearance of a small preview window 416. Preview window 416 lists not only date and time of the highlighted appointment but also user notes associated with it. The preview window is displayed while the graphical representation of the week view is still displayed and accessible.

It is also noted here that, in embodiments of the present invention implemented with a five-way navigation button; the well-known navigation by stylus pressure in the touch screen display is also available. The five-way navigation features do not limit stylus
5 input. In using a stylus, highlighting is accomplished by tapping on an appointment block. As in five-way highlighting, this causes the preview window to appear as shown in browser pane 409.

At first selection, when the graphical user interface is in week view, in embodiments of the present invention employing five-
10 way navigation, causes the insertion of a highlight on the first appointment block of the first day of the week, as shown at 409. As shown at 410, moving to the right with right button element 208 moves the highlight, with each successive step, to the first appointment block in each new day column. The summary
15 information shown in window 416 of Display 411 is automatically updated. As shown at 412, the browser pane 416 changes to reflect the information associated with the newly highlighted appointment block. If a user presses and holds an navigation button element, highlighting accelerates through days and appointments, such as
20 illustrated at 413.

Conflicting appointments can be navigated to on the week-view display using the same rule set. In the case illustrated, one more navigation left, as shown by seven button presses at 414, would go to the top conflicting appointment from 8-9:00 AM on Thursday, the 26th of July, colored blue in this example, before going to the first appointment on Wednesday the 25th.

As shown by display 421 of Figure 4B, pressing select button 209 removes the highlight and returns to browsing week by week with navigation left, 207, and navigation right, 208. On a tall screen device, preview will come up the same if the active input area is collapsed. Preview is always anchored to the top of the week view display.

When no highlight is applied, scrolling left or right (pressing left or right buttons) takes the display to the previous or next, respectively, week view. Pressing select, as at 435 of Figure 4B, inserts a highlight on the first appointment of the first day of the new week-view display. In the example illustrated, if the appointment is in the current week, the highlight is inserted in the next appointment, as shown by 424. After highlight is inserted, the preview window, 416, appears, anchored to top again in response to selection 435. Week view scrolls as necessary to show

appointments. Navigation left or right highlights the next or previous appointment and the associated details. Pressing select 209 again removes the highlight and preview 416.

Preview window 416 "times out" after a period if it is
5 selected by stylus input in one embodiment. It does not time out if activated with five-way navigation in one embodiment. No preview appears in days with no appointments, such as weekends in the example of view 428. Any day with appointments causes preview window, 432, to re-appear with appointment details as shown in
10 display 430.

As shown in view 430, navigation left or right follows the week-view convention of moving through weeks. Navigation up or down here scrolls appointments currently out of view into view.

It is noted that a command button bar 434 appears at the top
15 of the active input area (AIA), at the bottom of the display area, if the active input area is expanded. The toolbar disappears when active input area is collapsed. The buttons of the toolbar enable day, week, or month view selection by stylus input. Selection of the buttons can also be made with the five-way navigation buttons, with
20 the exception of "Go To" which is only available to stylus input.

Generally, after a highlight is inserted, a temporary preview window, 416 or 432, appears anchored to the top of the display.

Navigation left or right highlights the next appointment and its associated details. The month view, week, view and day view

5 displays appear as a grid and the five-way navigation through these views can also be referred to as "grid navigation." This is active while the preview window is displayed.

Select, when in the views and conditions illustrated in views 428, 430 and 431, removes the highlight and preview. Pressing and

10 holding left or right moves the highlight rapidly. The view shown at 431 is only shown if the active input area has been collapsed in a tall screen View. Otherwise, the behavior is similar to that of a square screen device or a tall screen device with its slider closed.

Figure 4C illustrates the behavior of embodiments of the
15 present invention when browsing calendar data by months, known as month view. Month view, 455, which can be accessed in some embodiments by pressing an application button as at 440, can be used, in these embodiments, to accomplish a number of calendar-related tasks. Some tasks are: to browse month to month to see
20 what day of the week a specific day falls on; to see weekend dates; to look for important event category information, using color data;

and (on a tall screen device using open mode, meaning the display is fully opened and the active input area is collapsed) to browse existing appointments before selecting a particular day to schedule an event or to get detailed information of an existing scheduled event.

Embodiments of the present invention support both square and tall screen devices. View 441 shows a representation of the display with a collapsible active input area (AIA) at and the Status Bar. This feature is available on tall screen devices in one embodiment.

Square screen devices generally do not have an active input area 455 or status bar 456. On tall screen devices with a sliding mechanism as is discussed above in Figures 3A, 3B and 3C, interaction with a user follows a square screen implementation until the device is slid to the open position. Even then, with the active input area expanded, the interaction follows the square screen implementation except for the availability of the status bar in some form factors. Once the display area is available on a tall screen device by collapsing the active input area, many of the preview functions available in embodiments of the present invention migrate to the new area, but only if the active input area is collapsed by the user.

The use of the five-way navigation button in a month view 455 is enhanced visually for some embodiments of the present invention, and specific enhancements are shown in the date book. A view of the previous or earlier months is available on a tall screen device if the
5 active input area is collapsed, with no highlight active.

In some embodiments, month view is enabled to provide visibility to specific categories of appointments, and also preview on a tall screen device with the active input area collapsed. When a appointment or event is highlighted, preview shows as many
10 appointments or events as possible. Pressing select on a highlighted day goes to the day view for the highlighted day.

As shown at 442 and 444, navigating left or right displays the previous or next month, respectively, 443 and 445. Select here, 446, inserts a highlight at current day if in the current month or on the
15 first day of a following month, as shown in view 447.

When a highlight is inserted, navigation left or right moves from day to day in the month view. As each day is highlighted, if the active input area is collapsed, the day preview 454 changes to the highlighted day. A small window opens to display a summary of the
20 appointments for the highlighted day. Select again toggles off the

highlight and navigation reverts to month to month stepping. If no appointment or event is scheduled in a day, no preview is shown.

Navigation left/right/up/down moves the highlight within the month and holding left or right causes rapid scrolling. When the preview

5 window is open, the monthly view interface remains displayed and can be used by the user to navigate to other days.

As noted earlier, many features in some embodiments of the present invention use color to enhance the available information.

Highlights for example are a different color in those embodiments
10 than appointments or other features presented in a display. In embodiments implemented in monochrome devices, differentiation can be achieved by the use of patterns or shades of gray.

Preview, 454, shown only on a tall screen device with the active input area collapsed and a highlight inserted as in view 452,
15 shows one line summary of each appointment or event scheduled in the highlighted day. Preview is displayed showing as many appointments or events as possible in the current day. If an appointment or event is scheduled, the preview is shown, even if only for one line. If no date is highlighted, the previous and/or next
20 month view is shown as in Figure 4D, view 464.

Figure 4D, view 460, illustrates the month view shown when a slideable tall screen device is closed. When the device is slid open, 461, status bar 475 becomes active as shown in view 462. When the active input area is collapsed, as in view 464, previous and next month mini-calendars become visible, 465. When a user opens a slideable tall screen device on which the active input area has been left in a collapsed state and no highlight is active, the mini calendars 465 become visible as well.

When entering a new month, as shown at 468 and the user then presses select, 469, then the first day of the month is selected and the preview window 473 for that day is displayed along with the graphical representation of the month in month view.

As many appointments or events as can be shown in the preview window are displayed. If no appointments or events are scheduled, a message such as "No Appointments Today" or some other message is displayed. In embodiments implemented with stylus input, a stylus scroll bar can be used to see the extent of appointments if there are more scheduled in a highlighted day than can be shown in the preview window, as shown at 471. When select 209 is pressed, 472, while a day is highlighted in month view and

the preview window is currently open for that day, that day is shown in full day view, 474.

Embodiments of the present invention are enabled to categorize appointments or events that are scheduled.

5 Categorization enables a user to prioritize different events and to view a set of events selected by category. Scheduled events of a given category can share a color characteristic so that events of a given priority are immediately visible in those embodiments implemented with color displays. Figure 5A shows the
10 categorization of several events and an exemplary interaction between the device and the user involving those events.

View 501 is a day view with three scheduled events in which the active input area is expanded. The user in this example wishes to set a new appointment for 2:00 PM on July 23, 2003. At 502 the
15 user selects 2:00 PM in the day view, 503, and at 504 inserts the appointment description or name, 505. By selecting the "details" button in the status bar 506, the event details window is shown, 510. The user then selects "category" from the event window, 507, and can select, in this embodiment, from four categories, 508.
20 "Business" is selected, 509, and the selection is shown in the event details window at 513. If there are no other changes to be made

from a list of default settings, selecting the "OK" from the status bar returns the display to the day view, as shown in Figure 5B at 520.

View 520 in Figure 5B shows a display of category color. In this embodiment, the associated color is in a "bullet," 527, adjacent to the meeting listing in day view. In other embodiments, other means can be used to display category color. In the day view, 520, the week view button can be selected, 521, resulting in the presentation of the week view, 522. It is noted, again, that the selection of buttons in the tool bar and the selection of views, dates, and scheduled events, can all be accessed by use of the five way navigation button.

The above selected category color appears, in this embodiment, in the highlighted event block in the week view. An event conflict, of which an example is shown in view 522 at 533, is shown with event blocks stacked side-by-side in the day column of the week view. The selected event remains highlighted during the display transition.

Selecting the month view tool bar button, 523, causes the display of the month view as shown at 524. When there is one

category of event in a time block, the category color can be displayed. If there is more than one event in the block, the color bar in month view is divided into the appropriate colors, as at 525. In this embodiment of the present invention, however, conflicts are not
5 displayed or flagged in the month view.

When viewing the month view as in 524, the year view tool bar button can be selected, 526, causing a current year calendar to be displayed, 528. It is noted that, with the active input area expanded, or in embodiments implemented in a square screen device, there is
10 room for only nine months to be shown. Pressing up element 205 or down element 206, as appropriate, shows the remaining three months, 531. When the active input area is collapsed, a full twelve month display is available. The year view can also be viewed by selecting year view from the options pull-down menu, 529, which, in
15 this embodiment, is available using five-way navigation.

In figure 6A, the process by which categories of events can be changed or hidden is illustrated. In view 601, pull down menu 600 is activated and "display options" is selected, 602. It is noted that, in embodiments implemented with five-way navigation, stylus
20 recognition command input is also enabled, as indicated in the right column of pull down menu 600. The "display options" selection can

be made, with the stylus, by a "l"+"y" input. It is noted again that stylus recognition is the name of one of many systems by which strokes of a stylus on a touch-screen display are interpreted as input by a user.

5 The display options window, 604, can be presented in four views to accommodate new settings: general, today view, day view 604, and month view 613. In some embodiments, the display options dialog, 605, defaults to the display options window for the current view or to the general window if the current view has no specific
10 options selected. Selecting the "OK" on-screen button causes the display of the associated display. The year view display, shown at 528 in Figure 5B, can also be caused to display by selecting "year view" from the options pull down menu.

When the options selections have been made, the display
15 options window can be closed and desired view is caused to display. In the example here, the day view is displayed, 621 in Figure 6B. In this particular example, Thursday, July 23, 2003 is the day under scrutiny. When the event in question is highlighted, 628, the event details window, 631, appears. In this window, the time and date of
20 the event can be set or changed, an alarm can be set with its attendant options, the category of the event can be changed and a

location can be entered into the detail notes. Each of these options can be selected by stepping through with the five way navigation button or by stylus input. Selecting OK returns the display to the previous view. As discussed above, selecting a view tool bar button, 5 629 or 630, causes the display of the associated view, 625 or 626. It is noted that the category "bullet" in the day view, previously discussed at 527 in Figure 5B, is not shown, in this embodiment, if the category option is not selected for the day view.

In embodiments of the present invention, category picking and 10 category color can be displayed or hidden in all views as shown in Figure 7A. There, "display options," 604 is selected, 708, from the options pull down menu, 600. The display options window is displayed and the "category column" option is selected, 710. Selecting view options 702 displays the view options dialog 605 15 and, in this example, "general" is selected, 713. From the resultant general display options window, 705, the "show category menu" option is selected at 714, then "OK" is selected, 706, causing the display of the day view at 721 in Figure 7B.

In view 721 of Figure 7B, a category line is now visible at the 20 top of the day view. Category column 727 is also visible in the day view. As shown in view 722 by selecting the week view, the

category line is also visible at the top of the week view and also, as shown in view 723, at the top of the month view. In this embodiment, switching back-and-forth between a display that has a category filter selected and one that does not has no effect on either
5 selection.

In embodiments of the present invention enabled with color displays, the user-selected category color is displayed in the category pull down dialog, 729. If there are categorized events scheduled in a view in which a different category is selected, those
10 events are hidden in the view. This can enable a user to instantaneously determine whether a particular category event, such as a business meeting, for example, is scheduled in a given day. A hidden event, however, can lead to a schedule conflict.

Schedule conflicts are resolved, in embodiments, as shown in
15 Figure 7C. There, event conflict alert dialog 737 is shown as when a user attempts to schedule overlapping events. The alert dialog box reminds the user that not all category events are shown and offers the option of viewing the hidden categories before scheduling the conflicting event. If the user elects to not view all categories of
20 events, the day view returns with the conflicted event signifying a conflict by highlighting the time in the time bar, as at 738. The

alarm highlight can be in an alarming color in color implementations.

By selecting the category line, 739, the category dialog is made visible and "all" can be selected, 740, which causes all categories of events to be shown, 734, and the conflicting events' duration

5 bars, 735, to be shown in an alarm color. If at 737 the user chooses to view all categories of scheduled events, the scheduling set time dialog box 741 appears and the event is scheduled.

In Figure 7D, the category links can be hidden if a user so decides. Options pull-down menu 600 is viewed and display options is selected, 747. The display options dialog 604 is shown and the view options dialog 605 is available to select the appropriate options set, as at 749. From there, the "show category menu" option is deselected at 750, and the category pick line is no longer visible at the top of the view pages, as shown in view 745.

15 The features discussed above, and others, are available to users of embodiments of the present invention implemented in portable hand-held computing devices enabled with five-way navigation buttons. However, embodiments are also implementable in other devices in which five-way navigation is enabled.

Embodiments of the present invention are expected to operate in a computer system, such as a handheld computing device. A configuration typical to a generic computer system is illustrated, in block diagram form, in Figure 8, generic computer 800 is
5 characterized by a processor 801, connected electronically by a bus 810 to a volatile memory 802, a non-volatile memory 803, possibly some form of data storage device 804 and a display device 805.

While it is noted that display device 805 can be implemented in different forms, embodiments of the present invention are
10 implemented in devices equipped with touch-screen displays combining a liquid crystal display (LCD) screen and a pressure-sensitive input membrane overlaying the display. Other embodiments can be implemented with cathode ray tube (CRT) displays or other implementations.

15 Bus 850 also connects an alpha-numeric input device 806 and cursor control 807. Embodiments of the present invention are enabled to accept alpha-numeric input by reading handwritten characters in the touch-screen display. In discussions above of embodiments of the present invention, handwritten characters are
20 written in the active input area (AIA). Other embodiments can accept alpha-numeric input from keystrokes in a keypad. Cursor

control in embodiments of the present invention is by either tapping appropriate areas of the touch-screen display with a stylus or, preferably, by pressing appropriate elements of a five-way navigation button.

5 Communication I/O device 808 can be implemented as a serial port, USB, or infrared port. In various implementations, communication I/O device 808 may be realized as a modem, an Ethernet connection, a wireless device, or any other means of communicating signals between a computer system and a
10 communications network. Some embodiments are enabled as wireless telephones. These phone-enabled devices also are equipped with telephone module 809.

 An embodiment of the present invention can be called a datebook. It is envisioned that users of the datebook will use four
15 usage modes. The first of these is a baseline usage mode. The datebook can be used without assigning categories to events or sharing categories. Although the category functionality provides additional organization and view features that are useful, many users may choose not to use categories in the datebook. In this case
20 the datebook will appear generally unchanged to existing users and they will want to maximize the space available for events

A second usage mode envisioned is one of minimal usage.

Users can assign categories to events for the added visual appeal of color and the functional ability to easily scan displayed views for different types of events. Users can view all categories and not
5 filter events which can easily lead to scheduling over "hidden" events. By not displaying the category picker in this scenario, more space is allowed for events.

A third usage mode envisioned is heavy category usage. Users that organize events into categories and generally have a full
10 calendar may also wish to view individual categories on a temporary basis. They will generally want the category picker and color displayed at all times if they are filtering events frequently. This will allow them to quickly switch back to all events for scheduling and to provide context for what they are viewing.

15 A fourth usage mode is shared category usage. Users may share event categories with family, friends and link events to receive updates. These users will generally belong to mode 2 and mode 3 but could be any of the above. They will generally have to make use of the category features in order to effectively share
20 categories. The users will need to be able to distinguish between their own events and other events with category color and filtering.

The shared feature is intended as lightweight sharing between themselves and others with basic functionality to reduce duplicate events.

A novel method and system for browsing, viewing and
5 manipulating calendar data in a weekly view mode and a monthly view mode have been disclosed. The method is enhanced with user input through a five-way navigation button implemented in a handheld computing device such as a handheld computing device.

The foregoing descriptions of specific embodiments of the
10 present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to
15 best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the Claims
20 appended hereto and their equivalents.